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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,049	03/02/2004	Xiaorong Wang	P03002US1A	2827

48985 7590 11/28/2007

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EXAMINER	
ASINOVSKY, OLGA	
ART UNIT	**PAPER NUMBER**
1796	
MAIL DATE	**DELIVERY MODE**
11/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/791,049	WANG ET AL.	
	Examiner	Art Unit	
	Olga Asinovsky	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *1-9 and 18-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-17 and 24-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/7/2007&10/17/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/07/2007 has been entered.

Applicants amend claim 10, present new claims 24-31 and new IDS.

There was a restriction in the present claims. The election was made without traverse (Remarks of 10/20/2006) to prosecute the invention of a polymer nanoparticle composition of Group II, claims 10-17.

Claims 10-17 and 24-31 are under examination.

Claim Rejections - 35 USC § 112

2. Claims 10, 13 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A chemical formulation of a polymer nanoparticle composition having mono-block and diblock polymer chains in claims 10, 13 is indefinite. Because, an outer layer and an inner layer can be formed from the same alkenylbenzene monomer, see support of that in claim 13. Forming diblock polymer chains is contradicted to a selected single monomer in part (a) in claim 10, since a selected monomer is cited under Markush

group practice. The formulation of nanoparticle composition having **diblock polymer chains** in claims 10 and 13 is not clear. A multilayer polymer nanoparticle composition wherein both: an outer layer and inner layer can be formed from the same alkenylbenzene monomer is not clear in claims 10, 13 and 24.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 10-17 and 24-31are rejected under 35 U.S.C. 103(a) as being unpatentable over Krom et al U.S. Patent 6,437,050 or EP0 265 142 each in view of Wang U.S. Patent 6,737,486.

Krom'050 has been discussed in the previous office actions.

Krom discloses a polymer nano-particle composition having less than about 100 nm, column 1, line 44. The polymer nano-particle composition has a poly(alkenylbenzene) core and a surface layer including poly(conjugated diene), column 2, lines 3-67. The nano-particle polymer is in the form of a core/shell structure, claim 1 at column 9. A core of polyalkenylbenzene is readable for being an inner layer in the present claims. A surface layer derived from polymerizing conjugated diene is readable for being an outer layer in the present claims. A polymeric composition can be crosslinked, claim 4 at column 9, by a crosslinking agent such as divinylbenzene. The nano-article polymer can be in the form of a diblock copolymer produced by living anionic polymerization process,

column 2, lines 51-65. A chemical formulation of the claimed mono-block polymer and chemical formulation of a diblock polymer in the present claim 10 is open to any monomer recited in part (a). Krom discloses a polydispersity index less than about 1.3, column 2, lines 14-15.

Krom does not disclose claimed polydispersity index between about 1.5 and 10 in the amended claim 10 and the new claim 26.

EP' 142 discloses a core/shell polymer composition having a nano-particle size morphology. The rubbery core polymer is formed from a polybutadiene by emulsion polymerization technique and than can be agglomerated to a large particle size to control the particle size, page 5. The core polymer can be crosslinked in the presence of divinylbenzene (DVB), page 3, lines 47 and 51. The shell polymer is formed by polymerizing vinylaromatic monomer. EP'142 discloses anionically polymerizing styrene and butadiene to form block copolymer, page 2, line 33. An outer shell is grafted onto the agglomerated core polymer, page 5, lines 45-49 and page 6, line 55. The core-to-shell ratio is preferably from about 60:40, page 4. The particle diameter size is about 250 nm, page 4, line 21.

EP'142 does not disclose claimed polydispersity index between about 1.5 and 10 in the present claims.

Wang '486 discloses manufacturing nanocomposites comprising polymer and layered material produced by living polymerization process, column 5, lines 1-3, for producing controllable polymeric products having desired structures and architectures, column 5, lines 16-21; column 4, lines 59-67; column 1, lines 51-60; column 11, lines 24-46 and column 12, lines 33-63. The ratio of Mw/Mn is less than 10, preferably less than 2, column 5, line 47. Wang'486 discloses a living polymerization process for a wide variety of readily available starting materials and catalysts, column 4, lines 65-67, wherein the desired Mw/Mn is depending on the selected initiator system, column 5, line 54 through column 12.

All cited references disclose a living polymerization process for obtaining nano-composites having desired structure such as graft copolymer, sore/shell copolymer, block copolymer or multi-layer composite.

Wang'486 discloses the claimed polydispersity index (Mw/Mn) in the range of 1.5 to 10, wherein the desired Mw/Mn is depending on the selected initiator system such that the initiating system has a benefit to control the polymeric structure and complex polymeric architecture, column 6, lines 1-18.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the polymerization process condition by teaching in Wang'486 invention for producing desired structure of nanocomposite material in Krom or EP'142 having desired polydispersity index in the range of 1.5 to 10, because all references disclose

the anionic living polymerization process condition, and there is no showing of unexpected results derived from said use in Krom or EP'142 invention.

It would have been obvious to one of ordinary skill in the art to control the polymerization condition in Krom and EP'142 such that the ratio of second monomer units to first monomer units greater than 1:1 for claim 10 or a ratio of said first monomer units to said second monomer units is between 0.1:1 and 0.8:1 for the present claim 24, since the charge of the selected monomer and the amount of said monomer are depending on the desired physical properties of the outer layer and inner layer, and these conditions are readable in the invention of Krom and EP'142, because the each reference discloses controlled polymerization process condition, and the selected monomer for obtained the outer layer in the present claims is not critical referring to first monomer units selected from the group consisting of alkenylbenzenes, conjugated dienes, alkylenes, and mixtures thereof.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. References have been considered. The closest reference is 2004/0143064 to Wang which is now Patent 6,875,818. The difference is that Wang'818 discloses a surface layer is being formed from polyconjugated diene, polyalkylene or mixture thereof; whereas in the present claims the inner layer is formed from alkenylbenzene monomer. Wang'818 does not disclose Mw/Mn in the claimed range of 1.5 to 10.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Olga Asinovsky whose telephone number is 571-272-1066. The examiner can normally be reached on 9:00 to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Olga Asinovsky
Examiner
Art Unit 1796

O.A

November 23, 2007

RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700